

Remarks

The present application had claims 1-8 and 11-21 pending. Applicants have herein amended claims 1, 20 and 21 and have cancelled claim 7. Accordingly, claims 1-6, 8 and 11 -21 are currently pending.

Support for the claim amendments of claims 1, 20 and 21 may be found throughout the application, including the previously pending claims. Specifically, support for the “water-based” amendment of claim 1 may be found in the Summary of the Invention (page 5, line 3) and on page 6, lines 13-14. Support for the addition of the phrase “for a period of 1 to 10 minutes” to claim 1 may be found in previously pending claim 7 (now cancelled) and on page 6, line 28 to page 7, line 2.

In the April 19, 2007 Office Action, the Examiner rejected claims 20 and 21 under 35 USC §112, second paragraph, as indefinite because of the phrase “or other known coating techniques” in claim 20 and the term “large” in claim 21. Although Applicants disagree with the Examiner’s position, Applicants have deleted the criticized phrase and term from claims 20 and 21. In light of Applicants’ amendment, reconsideration of the rejection under 35 USC §112 is hereby requested.

The Examiner in the April 19th Office Action also rejected all the pending claims under 35 USC §103 as obvious over Starz, et al. (USP 6,514,296) in view of Yano (USP 5,380,806) and Tsai, et al. (USP 6,514,296).

Applicants respectfully disagree with the Examiner’s position. However, in order to advance prosecution of the present application, Applicants have amended claim 1 (the only independent claim) to restrict the claimed invention to water-based catalyst inks, and have move the limitations of previously pending claim 7 into claim 1.

With respect to the cited references, the Starz, et al. reference does not print a water-based ink; instead it uses an ink containing predominantly glycerol, which is a very high boiling solvent (see column 7 of Starz, et al.). There is no teaching or suggestion in Starz, et al. to use a water-based ink as now required in amended claim 1. Furthermore, as acknowledged by the Examiner, the Starz, et al. reference does not teach the use of a separate leveling step, and certainly does not teach the leveling requirement now set forth in amended claim 1.

The Yano reference discloses a screen printing ink for the covering of flexible printed circuit boards (see claim 1). The ink of Yano comprises a polyurethane and epoxy component (see title). This ink does not contain any water. To the contrary, the composition is very sensitive to humidity, thus it has to be prepared under a nitrogen atmosphere (see the section "Examples", column 8, lines 30-46). Accordingly, the ink of Yano teaches away from the water-based ink of the present invention.

Additionally, contrary to the opinion of the Examiner, the Yano reference does not disclose a "leveling procedure". Yano merely states that the amount of leveling agent must be adjusted to a range of 0.1 to 10 parts per weight in the ink formulation. If the amount of leveling agent is less than 0.1 parts per weight, the screen mesh is not sufficiently leveled and a rough surface of the coating occurs. This is due to the fact that not enough leveling agent is contained in the ink. This problem cannot be remedied or adjusted by any additional leveling process or procedure.

Thus, the teachings of Yano do not apply to the present invention. Yano is directed to water sensitive ink compositions and does not disclose a leveling process under humid atmosphere, as required by the presently claimed invention.

The Tsai, et al. reference is directed to the manufacture of double-layer bipolar capacitors (see the field of invention). Tsai discloses a printing process for a two-component epoxy

material having a useful lifetime of about 30 minutes. "Constant temperature and humidity of the epoxy are important to assure an even applied coat" (see column 29, lines 44-53, emphasis added). The humidity and temperature values are similar to ambient conditions and refer to the epoxy material itself, not the leveling process. This is because the epoxy material would start to cure at higher temperatures. Thus, the teachings of Tsai are not applicable to the present invention.

In summary, Yano and Tsai do not teach a coating process of water-based inks – the subject matter to which the present invention is directed. Yano's inks are humidity sensitive, as they contain polyurethane compounds. Tsai's inks are temperature sensitive as they contain a one pot epoxy with a pot life of 30 minutes at room temperature. Furthermore, Yano does not disclose a leveling process under humid atmosphere.

According to the present invention (as set forth in amended claim 1), by applying a leveling period of 1 - 10 minutes under controlled atmosphere and temperature, the claimed process leads to smooth, uniform catalyst layers with a very low surface roughness (see the specification page 7, line 1-2).

Yano, Tsai and Starz are all silent in regard to a leveling process under controlled atmosphere and temperature, and they certainly do not disclose, teach or suggest a leveling period of 1 - 10 minutes, as required by the pending claims.

Contrary to the cited references, the present invention uses water based inks. Water-based inks suffered from a short screen life due to the rapid evaporation of the main solvent water (see the specification, page 4, lines 4-11). Moreover, leveling and wetting characteristics are very poor for water-based inks (see the specification, page 3, lines 26-28). In order to solve these problems, the present invention comprises a coating step and a leveling step, both under controlled humidity (i.e., in a humid atmosphere containing water mist; see example 1).

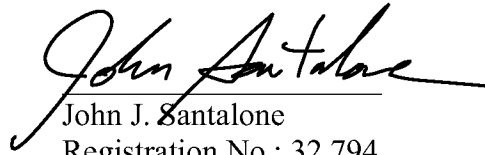
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In view of the foregoing the remarks, reconsideration of the rejection under 35 USC §103 and allowance of the application are respectfully requested.

No fee is deemed due for this amendment, other than the fee for the requested three month extension of time and the fee for the accompanying RCE, which Applicants are concurrently filing with the present response. If any additional fees are due, or an overpayment has been made, please charge, or credit, our Deposit Account No. 11-0171 for such sum.

If the Examiner has any questions regarding the present application, the Examiner is cordially invited to contact Applicants' attorney at the telephone number provided below.

Respectfully submitted,


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